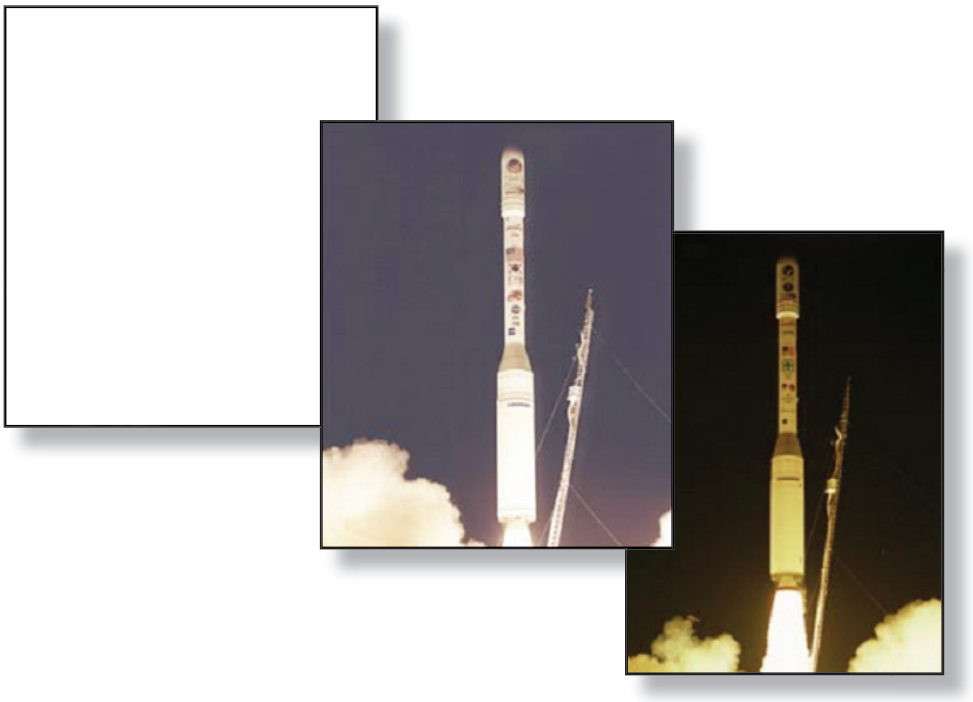
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Air Force SBIR/STTR

Success Story

PROVIDING SATELLITES A SMOOTHER RIDE TO ORBIT



As a part of the Small Business Innovation Research program, AFRL Space Vehicles Directorate's Soft Ride for Small Satellites vibration isolation team and CSA Engineering, Inc., designed, fabricated, component-tested, whole-spacecraft-tested, delivered flight hardware for, and successfully flew the world's first whole-spacecraft vibration isolation system on Orbital Sciences Corporation's Taurus launch vehicle. The vibration isolation team successfully transitioned whole-spacecraft launch vibration isolation technology, providing a technology breakthrough to the Air Force (AF).

This technology will enhance existing AF capability and greatly reduce costs for current expendable launch vehicles as well as for future expendable and reusable launch vehicles. To date, this system has protected a total of seven satellites spanning six launch missions.

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Accomplishment

The team's vibration isolation system was the first whole-spacecraft vibration isolation system flown on a spacecraft. The whole-spacecraft vibration isolation system successfully flew on the Ball Aerospace-built Naval Research Laboratory Geosat Follow-On spacecraft during an orbital mission flown out of Vandenberg Air Force Base, California, to study physical oceanography.

The team is now actively involved in transitioning whole-spacecraft vibration isolation to other missions and users due to the flight demonstration's extreme success. In addition, the National Reconnaissance Organization (NRO) used this system on its Space Technology Experiment (STEX) spacecraft. The isolation system reduced the structural-borne vibrations on the spacecraft by a factor of 3 to 5 while meeting all launch vehicle and spacecraft requirements. The STEX mission manager estimates that this system saved the NRO $20 million in redesign and schedule costs.

The team is currently performing feasibility analysis for the Military Satellite Communications Joint Program Office, which is focused on evolved expandable launch vehicle missions. The technology will be converted into a space asset once it is baselined in the Peacekeeper launch vehicle.

Background

In the last 10 years, billions of dollars have been lost due to satellite malfunctions and failures resulting in mission failure and loss of performance. Reduced vibration environments for future spacecraft will impact the overall cost of spacecraft design, testing, and operation. With suitable vibration environments, several subsystems, like solar arrays and other flexible structures, will become lighter and use less expensive materials, resulting in both a mass and production cost savings.

Space Vehicles
Support to the Warfighter

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (04-VS-05)